Working Group N°5:
Wastewater Reuse and Contaminants of Emerging Concern

Screening campaign of selected antibiotic resistance determinants and mobile genetic elements (AR/MGE) in WWTPs in Europe

Announcement and invitation to participate

Background

Antibiotic resistance prevalence has increased worldwide over the last decades with dramatic consequences for human health. This situation is in part due to the excessive use of antibiotics. Because hospitals may discharge their effluents into municipal collectors, and palliative care and patient recovery is increasingly made at home, municipal sewage treatment systems are considered as one of the most important hotspots for resistance propagation in urban areas. On average, a municipal wastewater treatment plant discharges billions of antibiotic resistant bacteria (>10^{12}) per day to the surrounding environment, facilitating horizontal transmission of mobile antibiotic resistance genes to other bacteria thriving in soil and water environments.

Recently the WHO re-emphasized the need for coordinated analyses of antibiotics and resistance determinants to combat the current rise of antibiotic resistance. In accordance to this need and in line with the aims and scope of its mandate, NORMAN Working Group 5 is about to initiate the monitoring of antibiotic resistance genes in treated wastewater.

Objectives

Specific objectives of this proposal include:

- Selection of target genetic determinants (e.g. resistance genes, mobile genetic elements)
- Definition of harmonized protocols for assessment of antibiotic resistance in treated wastewater (including sampling, sample processing and analysis)
- Generation of qualitative and quantitative data on each of the selected targeted genetic determinants in wastewater and/or surrounding environments
- Development of a database to store the collected data, by location, sample characteristics and genetic determinants, to be maintained in the long run and open to other partners

Methodology

Five laboratories have been assigned the task of performing the microbiological analyses while nine institutes will be responsible for collecting and sending wastewater samples for analyses.

Methods and analyses will be harmonized between the five laboratories for the microbiological analyses and sampling methods will be harmonized between the nine institutes responsible for sending the wastewater samples.

As a first goal, the laboratories will quantify six antibiotic resistance genes in treated wastewater effluents from Austria, Cyprus, France, Germany, Israel, Italy, Portugal, Spain, Turkey, and UK.

The genes under focus will be *intI*1, *sul*1, *bla*CTX-M, *bla*TEM, *van*A and *qnr*S in accordance with the relevant conclusions drawn by the recently completed COST Action DARE (TD0803). The coordination of the sampling will be carried out by Nireas-IWRC, University of Cyprus in collaboration with Vienna University of Technology and the genetic analysis will be coordinated by the Institute of Hydrobiology at the TU Dresden in collaboration with the Karlsruhe Institute of Technology (KIT), Germany.

Participants

Organisations	Country	Scientist / contact persons
Nireas-IWRC, University of Cyprus	Cyprus	Despo Fatta-Kassinos
Technical University of Dresden	Germany	Thomas Berendonk
Universidade Católica Portuguesa	Portugal	Celia Manaia
Volcani Agriculture Research Center	Israel	Eddie Cytryn
Vienna University of Technology	Austria	Norbert Kreuzinger
Middlesex University	UK	Hemda Garelick
IDAEA-CSIC	Spain	Josep Bayona
Universidad de Almería	Spain	Ana Agüera
University of Salerno	Italy	Luigi Rizzo
CNRS/University of Lorraine	France	Christophe Merlin Marie-Noëlle Pons
Karlsruhe Institute of Technology	Germany	Thomas Schwartz
Catalan Institute for Water Research-ICRA	Spain	Sara Rodriquez
Namik Kemal University	Turkey	Sureyya Meric Pagano

Contact

NORMAN members interested in participating should reply by 31 July 2014. They will then be sent a sampling protocol for collection and submission of their samples. They will bear the costs of the analysis, but such costs will be treated as an in-kind contribution to the NORMAN Association Joint Programme of Activities for 2014.

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